University of Portland
School of Engineering

EE 261-Electrical Circuits-3 cr. hrs. Fall 2012

Midterm Exam # 3

(Friday, November 30, 2012)
(Closed Book Exam, Three Formula Sheet are Allowed)
(Total Time: 55 minutes)

Name:_____☺

Signature:_____☺

> *"An honest mind possesses a kingdom."*
> **Lucius Annaeus Seneca (4B.C.–65A.D.)**
>
> *"Honest people are the true winners of the universe."*
> **Anonymous**

| P # 1 (25 pts.)	P # 2 (25 pts.)	P # 3 (25 pts.)	P # 4 (25 pts.)	Total (100 pts.)

1. (15 mins., 25 points) In the electric circuit shown, the switch closes at $t = 0$, after being open for a long time. Find the complete mathematical expression for the current $i(t)$ through the 1.2 kΩ resistor for $t > 0$. (Please show your work clearly and provide brief justifications for the steps you take. Also, don't forget to provide the correct units for your answer.)
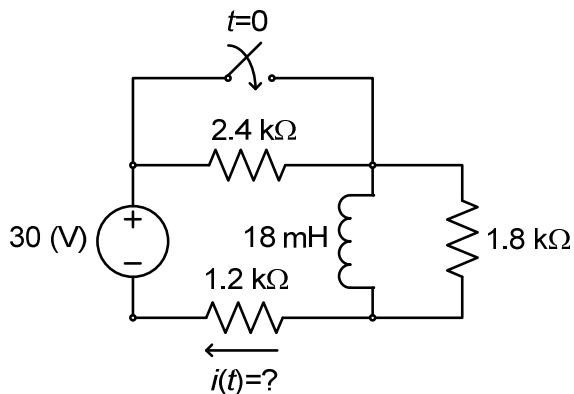
2. (15 mins., 25 points) In the electric circuit shown, find the complete mathematical expression and <u>sketch</u> the voltage $v_x(t)$ across the 2 kΩ resistor for $t > 0$. (Please show your work step by step.)

0.5 mF

2 kΩ

$i_s(t)$

2 kΩ

+

$v_x(t)$=? for $t > 0$

−

$i_s(t)=[10-30u(-t)]$ (mA)
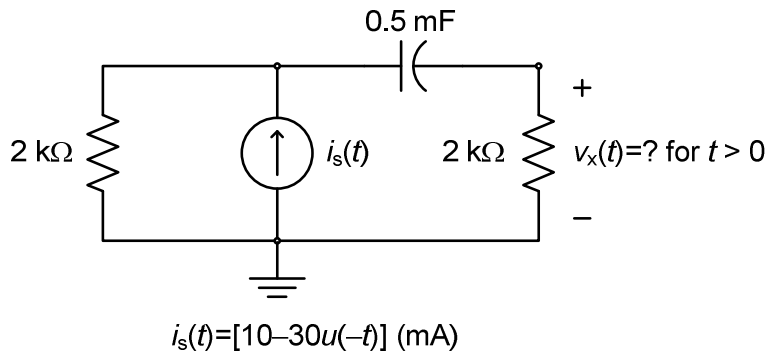
3. (20 mins., 25 points) Consider the electric circuit shown. Solve for the complete mathematical expression for the capacitor voltage $v_C(t)$ for $t \geq 0$. Show your work step by step including justifications.
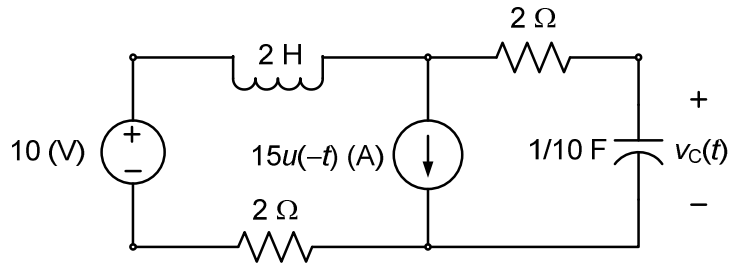
(4) (20 mins., 25 points) For the ideal op-amp circuit shown, find the complete mathematical expression for current $i(t)$ flowing through the 3 kΩ resistor on the right for $t > 0$. Show your work including justifications step by step.